

Application No. 10/584,694
Amendment Dated: October 19, 2011
Reply to Office Action Dated July 20, 2011

Remarks

Claims 1, 3, 5-6 and 9-27 are pending.

Claims 1, 3, 5-6 and 9-27 stand rejected.

Claims 1, 6, 21, 26 and 27 have been amended.

Claims 1, 3, 5-6 and 9-27 are submitted herein for review.

No new matter has been added.

In the Office Action, the Examiner has removed the prior rejection, but now rejects each of independent claims 1, 6, 21, 26 and 27 under 35 U.S.C. § 103(a) as being unpatentable over Rath (U.S. Patent No. 3,730,306). Applicants respectfully disagree with the Examiner and submit the following remarks in reply.

Applicants begin by noting that the Examiner cites to only the Rath reference when forming the rejection under 35 U.S.C. § 103. In this context, the Examiner contends that Rath teaches all of the primary structural elements of the present independent claims as outlined on pages 2-3 of the Office Action. Regarding the various dimensions as claimed in the independent claims 1, 6, 21, 26 and 27, the Examiner admits that Rath does not teach such features but considers them obvious design choice, thus completing the rejection. See Office Action at page 3-4.

Applicants respectfully submit that the Rath reference does not teach the same structure as claimed in the present independent claims 1, 6, 21, 26 and 27. Separately, the claimed sizing and ranges of the components of claim 1 are not mere design choices, but are specifically claimed to address a problem of stability and to prevent axial motion during braking without the

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need to be excessively sized as per the prior art. See for example, background on pages 2-3 of the application as filed.

Regarding the first point, each of independent claims 1, 6, 21, 26 and 27 include the feature that the connecting structure comprises one or more shells, arc-shaped or arranged along an arc, formed as a single integral structure having both side walls along outer circumferential edges thereof. Such a feature is shown in Figures 2-4 and is discussed for example in on page 6, line 20 through page 7, line 3.

On the contrary, Rath describes that the brake caliper is made up of two half castings 10 and 12 bolted together by connecting bolts 14 which pass through the bridge section of the caliper straddling the outer edge of the disc 16 (see e.g. Rath at col. 1, lines 39-43).

For at least this reason, Applicants request that the rejection of independent claims 1, 6, 21 and 26 be withdrawn. As claims 3, 5, 9-20 and 22-25 depend from claims 1, 6 and 21 these claims should be allowed for at least the same reason.

Regarding the second point, each of independent claims 1, 6, 21, 26 and 27 include features regarding the slenderness of the one or more shells. The prior art of Rath does not disclose these features as claimed, nor are the claimed features obvious design choices or changes relative to the Rath reference.

Regarding claim 1, Rath does not disclose that the slenderness of said one or more shells ... is less than 17/100. On the contrary, the Rath arrangement requires the two half castings 10, 12 to be bolted together by connecting bolts 14 which pass through the bridge sections (see e.g. Rath at col. 1, lines 39-41, Figure 3) so that at least in the region of the connecting bolts 14 the claimed slenderness requirement of the bridge element could never be met.

Moreover, Rath fails to disclose that the radial thickness of all shells forming the connecting structure is constant along the entire circumferential extension of the connecting structure. On the contrary, as can be clearly seen in Figure 3 of Rath, the external sides of flank portions 40 and 42 are radially thinner than their internal sides and the average radial thickness of the flank portions 40 and 42 is clearly smaller than the radial thickness of the central portion 38.

Additionally, Rath does not disclose that the total area of the through opening of the shells is less than 40% of the total area of one or more shells including that of the through opening as claimed in claim 1. On the contrary, Rath requires a pair of windows 44, 46 for pad inspection purposes and teaches that the size and spacing of such windows is such that the whole of the pad guiding surfaces 34 are also exposed to view (see e.g. col. 1, lines 61 to 65). As such, an inspection could not be obtained with a window area less than 40% of the total area of the connecting structure, and thus Rath teaches away from the claimed feature.

Also, Rath fails to disclose that the slenderness of the entire connecting structure is between $2/100$ and $4/100$ as claimed in claim 1. Figure 3 of Rath clearly shows that each single portion of the connecting structure receives at least one connecting bolt 14 so that it would be impossible to configure the connecting structure with the claimed slenderness.

Regarding claim 6, as explained above in connection with independent claim 1, Rath does not disclose: that the connecting structure is formed as a single piece with both side walls, that the slenderness of the one or more shells ... is less than $17/100$; that the radial thickness of all shells forming said connecting structure is constant along the entire circumferential extension of the connecting structure; and that the average thickness of the shell is less than 20 mm (due to

the connecting bolts 14 received in the bridge elements) as claimed in claim 6.

Moreover, Rath does not disclose that the circumferential extension of the connecting structure corresponds to an angle of aperture of a sector of circle of between 100° and 130° as claimed in claim 6. On the contrary, Rath teaches to provide a connecting bolt 14 in each individual portion of the connecting structure. Therefore, a circumferential extension of the connecting structure would result in the need to arrange even more connecting bolts and to arrange them also further away from the hydraulic cylinders 24, 26, so that the entire caliper structure would become more complex, more expensive and less efficient from a force transmission point of view. Accordingly, a skilled person, starting from Rath would not have chosen to circumferentially extend the connecting structure of the caliper body as claimed in claim 6.

Regarding claim 21, as explained above in connection with independent claims 1 and 6, Rath does not disclose: that the slenderness of said one or more shells ... is less than $17/100$; that the radial thickness of all shells forming said connecting structure is constant along the entire circumferential extension of the connecting structure; that the total area of the through openings is less than 40% of the total area of the one or more shells including that of said through openings; and that the slenderness of the entire connecting structure ... is between $2/100$ and $4/100$ as claimed in claim 21.

Moreover, Rath fails to disclose that the circumferential extension of at least one of said shells is at least double its axial extension relative to axis to the rotation. On the contrary Rath only requires that the openings in the connecting structure provide inspection windows for pad inspection purposes and that the size and the spacing of the windows is such that not only the

pads, but also the pad guiding surfaces 34 are exposed to view (see e.g. column 1, lines 59-65). Accordingly, an increase of the circumferential extension of the portions of the caliper bridge section in Rath would inevitably invade the inspection windows 44, 46 and jeopardize their declared function. Therefore, one skilled in the art, starting from Rath, would not have changed the shape of the caliper bridge section as required by independent claim 21.

Regarding claim 26, as explained above in connection with the previous independent claims, Rath does not disclose: that the connecting structure is not formed integrally with the side walls; that the slenderness of said one or more shells is less than $17/100$; that the radial thickness of shells forming said connecting structure is constant along the entire circumferential extension of said connecting structure; that the area of opening of the through opening is less than 40% of the total area of the one or more shells including that of said through openings; and that the slenderness of the entire connecting structure ... is between $2/100$ and $4/100$ as claimed in claim 26.

With regard to claim 27, for the same reasons explained in connection with independent claim 1, Rath does not disclose: that the connecting portion is formed as a single piece with the side walls; that the slenderness of said one or more shells ... is less than $17/100$; and that the radial thickness of all shells forming the connecting structure is constant along the entire circumferential extension of said connecting structure as claimed in claim 27.

Contrary to the Examiner's arguments on page 4 of the Office Action, it is not obvious to one of ordinary skill in the art to change the structure of the caliper in Rath in accordance with the claimed limitations and it is even less obvious for one of ordinary skill in art to focus the structural design of a brake caliper to maximize the brake disc diameter with respect to a given

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wheel rim diameter. In fact, as best understood, none of the prior art references, including Rath, suggest a design constraint or describes that there is any need of or focus on maximizing the available space for a brake disc with respect to a given wheel-rim diameter. On the contrary, the entire range of available reference art deals principally with the aims of cost reduction, material saving, heat dissipation, and structural resistance.

For at least these additional reasons, Applicants request that the rejections of each of independent claims 1, 6, 21 and 26 be withdrawn. As claims 3, 5, 9-20 and 22-25 depend from claims 1, 6 and 21 these claims should be allowed for at least these same reasons.

In view of the foregoing, Applicants respectfully submit that pending claims 1, 3, 5-6 and 9-27 are in condition for allowance, the earliest possible notice of which is earnestly solicited. If the Examiner feels that an interview would facilitate the prosecution of this Application he is invited to contact the undersigned at the number listed below.

Dated: October 19, 2011

Respectfully submitted,

SOFER & HAROUN, L.L.P.

By /Robert Haroun/
Robert Haroun
Reg. No 34,345
317 Madison Avenue, Suite 910
New York, NY 10017
(212) 697-2800
Customer # 39600